UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,717	06/27/2003	Steven J. Martin	58633US002	9412

32692 7590 03/17/2005

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER	
MARKHAM, WESLEY D	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 03/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/607,717	Applicant(s) MARTIN ET AL.	
	Examiner Wesley D Markham	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _2/23/2005 (the RCE)_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-26_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-26_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _27 June 2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _10/25/04_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application on 2/23/2005 (with a certificate of mailing dated 2/17/2005) after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office Action (mailed on 11/17/2004) has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/23/2005 has been entered.

Response to Amendment

2. Acknowledgement is made of the amendment filed by the applicant on 2/23/2005, in which independent Claims 1 and 26 were amended. **Claims 1 – 26** are currently pending in U.S. Application Serial No. 10/607,717, and an Office Action on the merits follows.

Information Disclosure Statement

3. The IDS filed by the applicant on 10/25/2004 is acknowledged, and the references listed thereon have been considered by the examiner as indicated on the attached copy of the PTO-1449 form.

Drawings

4. The one (1) sheet of formal drawings filed by the applicant on 6/27/2003 is acknowledged and approved by the examiner.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 2, 4 – 8, 10 – 23, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Invie et al. (USPN 6,277,485 B1) in view of <u>either</u> the applicant's admitted prior art (AAPA) or Nippon Sheet Glass (referred to hereinafter as Nippon) (JP 2002-187740 A), in further view of Birch (US 2004/0043142 A1).

8. Regarding independent **Claims 1 and 26**, Invie et al. teaches a method for applying an antisoiling coating on an article (title and abstract), the method comprising providing an article comprising an optical substrate (Col.1, lines 6 – 14, Col.3, lines 46 – 52, and Col.4, lines 32 – 56), specifically a polymeric optical substrate (Col.3, lines 46 – 52, Col.4, lines 33 – 56) and an antireflective coating (ARC) disposed on a surface of the optical substrate (abstract, Col.1, lines 15 – 62, Col.2, lines 52 – 55, Col.3, lines 46 – 67, Col.4, lines 1 – 32, Col.5, lines 51 – 67, and Col.6, lines 1 – 8), and applying an antisoiling coating comprising silicon that is disposed on at least a portion of the ARC, wherein the ARC is between the optical substrate and the antisoiling coating (abstract, Col.1, lines 53 – 67, Col.2, lines 24 – 63, Col.5, lines 51 – 67, Col.6, lines 34 – 67, and Cols.7 – 10 (for the specifics of the antisoiling composition and its application)). The ARC comprises sputter coated metal oxide films that are relatively porous and consist of clusters of particles (Col.4, lines 23 – 32), as required by the amended claims. Invie et al. does not explicitly teach replacing the antisoiling coating by treating the article with a plasma under vacuum conditions to remove the previously applied antisoiling coating from the ARC and disposing a new antisoiling coating on the ARC of the article. However, the AAPA teaches that, in the art of antisoiling coatings deposited on ARC-coated optical substrates, the antisoiling coatings may need to be <u>removed and replaced</u> at times, such as when a previously applied antisoiling coating becomes defective or partially removed during the use of the article ("Background" section of the applicant's specification, page 2, lines 11 – 15). Nippon also teaches that, in the art of water-

repellent fluorosilane coatings (i.e., antisoiling coatings) on optical substrates (e.g., glass or silica-coated glass), the aforementioned coatings deteriorate over time and must be removed (i.e., to provide a clean surface) and replaced (paragraphs [0010], [0020], [0021], [0027], [0057], and [0070] of the translation). Therefore, it would have been obvious to one of ordinary skill in the art to remove the previously deposited antisoiling coating of Invie et al. from the ARC (i.e., when such coating deteriorates and/or becomes defective over time and through use) and dispose a new antisoiling coating on the ARC of the article of Invie et al. (as taught by either the AAPA or Nippon) with the reasonable expectation of successfully and advantageously renewing the antisoiling capability of the ARC-coated optical substrate, thereby prolonging the use of the aforementioned substrate (i.e., due to the renewed antisoiling coating). The combination of Invie et al. and either the AAPA or Nippon does not explicitly teach removing the antisoiling coating by treating the article with a plasma under vacuum conditions. However, Birch et al. teaches a method of removing a hydrophobic coating from a glass substrate by plasma cleaning under vacuum conditions (Abstract, paragraphs [0012] and [0048] – [0056]). Removing the coating by the vacuum plasma cleaning process of Birch et al. has the following advantages: (1) effective removal of a wide variety of coatings (paragraphs [0012], [0037], and [0040]), (2) no generation of liquid waste (paragraph [0012]), (3) the ability to remove thicker coatings while leaving behind virtually no visible residue (paragraph [0014]), and (4) inexpensive operation, generates no regulated waste streams, and produces clean surfaces in very short time periods (paragraph [0054]).

Further, the vacuum used in the plasma cleaning facilitates uniformity through dispersion of the plasma and therefore quickly and effectively cleans the entire surface of the material simultaneously and evenly (paragraph [0056]). Therefore, it would have been obvious to one of ordinary skill in the art to remove the antisoiling coating of Invie et al. by treating the article with a plasma under vacuum conditions (as taught by Birch et al.) with the reasonable expectation of successfully and advantageously removing the coating by using a method that does not generate waste, leaves behind virtually no residue, is inexpensive to operate, and produces clean surfaces in very short time periods and with a high uniformity. Further, one of ordinary skill in the art would have reasonably expected to perform the aforementioned plasma cleaning / coating removal process on a porous, antireflective coated substrate without damaging the antireflective coating (e.g., without reducing its effectiveness) based, at least in part, on the teaching of Invie et al. that <u>sputter coated (i.e., porous) antireflective film-coated substrates can successfully be exposed to plasma cleaning without any apparent damage</u> (Col.19, lines 59 – 67, Col.20, lines 1 – 37; see also Woodruff et al. (USPN 6,469,685) (Col.5, lines 18 – 23) and Dickey et al. (USPN 5,372,874), which are simply cited to show that the "CDAR" antireflective coated glass that is successfully plasma cleaned by Invie et al. comprises sputter-coated metal oxide layers).

9. The combination of Invie et al., either the AAPA or Nippon, and Birch et al. teaches all the limitations of **Claims 2, 4 – 8, 10 – 23, and 25** as set forth above in paragraph 8 and below, including a method wherein / further comprising:

- Claim 2: The pressure during the plasma treating is in the range of 0.05 to 0.5 mm Hg (paragraph [0053] of Birch et al.).
- Claim 4: The plasma treating leaves the ARC and the optical substrate intact. Specifically, Birch et al. makes no mention or suggestion that the plasma cleaning process used to remove a coating on an article significantly damages or modifies the underlying substrate. Additionally, Nippon teaches that, in the art of removing a water repellent film from a substrate by using a plasma, the underlying substrate should be left intact (paragraph [0027]). Therefore, it would have been obvious to one of ordinary skill in the art to perform the plasma cleaning process of the combination of Invie et al., either the AAPA or Nippon, and Birch et al. under conditions such that the underlying substrate (i.e., the ARC-coated optical substrate of Invie et al.) is left intact because by doing so, one would insure that the ARC-coated substrate is not damaged, thereby achieving the goal of the combination of Invie et al., either the AAPA or Nippon, and Birch et al. (i.e., simply replacing a damaged or worn antisoiling coating on an ARC-coated substrate).
- Claims 5 and 6: The treating removes less than 500 A of the antisoiling coating (Claim 5), particularly less than 100 A of the antisoiling coating (Claim 6). Specifically, Invie et al. teaches that the antisoiling coatings have a thickness of about 15 A to about 150 A (Col.2, lines 56 – 63). Therefore, it would have been obvious to one of ordinary skill in the art to remove less than 100 A of the antisoiling coating of Invie et al. because, when the coatings

have an overall thickness of less then 100 A (e.g., 15 A, as taught by Invie et al.), no more than the thickness of the coating can be removed. For example, when a 15 A coating is used as the antisoiling coating in the process of Invie et al., the amount of coating removed by the plasma process is at most 15 A (i.e., the entire coating), which is a value within the applicant's claimed range.

- Claim 7: Washing the article, placing the article in an ultrasonic bath, chemically treating the article, or a combination thereof prior to the plasma treating (Col.11, lines 1 – 4 of Invie et al.).
- Claim 8: The article is an optical lens (Col.1, line 7 of Invie et al.).
- Claims 10 – 12: The ARC comprises a metal oxide, metal sulfide, metal halide, metal nitride, or combination thereof, particularly at least one metal oxide layer, particularly wherein an outer layer of the ARC comprises silicon oxides (Col.4, lines 8 – 31, Col.5, lines 54 – 57 of Invie et al.).
- Claims 13 and 14: The plasma is produced using argon, xenon, air, water, oxygen, or a combination thereof, particularly air (paragraphs [0049] and [0050] of Birch et al.).
- Claims 16, 18, 21, and 22: The antisoiling coating comprises a siloxane, particularly a fluorinated (di)alkylsiloxane, perfluoropolyether siloxane, or combination thereof, particularly produced from a fluorinated silane precursor comprising a compound having the formula claimed by the applicant in Claims 21 and 22 (abstract, Col.2, lines 29 – 51, Col.6, lines 34 – 46 and 64 –

67, and Cols.7 – 9 of Invie et al., which describe in detail the silane precursors and siloxane coatings claimed by the applicant).

- Claims 15 and 17: The antisoiling coating(s) has/have a static water contact angle of at least 80 degrees and is/are hydrophobic and/or oleophobic. The combination of Invie et al., either the AAPA or Nippon, and Birch et al. does not explicitly teach these limitations. However, as set forth in the discussion of Claims 16, 18, 21, and 22 immediately above, the antisoiling coatings taught by Invie et al. are the same as the applicant's claimed and disclosed coatings. Therefore, the antisoiling coatings taught by Invie et al. would have inherently possessed the applicant's claimed water contact angle, hydrophobicity, and oleophobicity (i.e., because these properties are simply inherent properties of a coating that are determined by the coating material used – since the same coating material is used, the coatings would have the same physical and chemical properties).
- Claims 19 and 20: The disposing comprises providing a solution of a fluorinated silane or fluorinated siloxane precursor in an inert solvent, particularly an alkyl perfluoroalkyl ether, and immersing the plasma treated article into the solution (Col.9, lines 39 – 54, and Col.10, line 19 of Invie et al.).
- Claim 23: The disposing comprises placing a fluorinated silane or fluorinated siloxane precursor on a fabric, and transferring the precursor from the fabric to a surface of the plasma treated article. Specifically, Invie et al. does not

explicitly teach this limitation. However, the fluorinated silane or fluorinated siloxane precursor application method used by Invie et al. does not appear to be particularly limited or critical (Col.10, lines 17 – 25). Nippon teaches that it was known in the art at the time of the applicant's invention to apply a water repellent fluorinated silane treatment solution to a coated glass substrate by placing the solution on a cotton cloth (i.e., a fabric) and then transferring the solution from the fabric to a surface of the article (paragraphs [0057] – [0059]). Therefore, it would have been obvious to one of ordinary skill in the art to apply the antisoiling coating of Invie et al. by placing the fluorinated silane or fluorinated siloxane precursor of Invie et al. on a fabric, and transferring the precursor from the fabric to a surface of the plasma treated article with the reasonable expectation of success and obtaining similar results (i.e., successfully re-applying the antisoiling coating to the ARC-coated optical article, regardless of the specific method used to apply the coating).

- Claim 25: Curing the new antisoiling coating (Col.10, lines 56 – 67 of Invie et al.).

10. Claims 4 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Invie et al. (USPN 6,277,485 B1) in view of the applicant's admitted prior art (AAPA), in further view of Birch (US 2004/0043142 A1), and in further view of Nippon.

11. The combination of Invie et al., the AAPA, and Birch teaches all the limitations of **Claims 4 and 23** as set forth above in paragraph 8, except for a method wherein the

plasma treating leaves the ARC and the optical substrate intact (Claim 4), and the disposing comprises placing a fluorinated silane or fluorinated siloxane precursor on a fabric, and transferring the precursor from the fabric to a surface of the plasma treated article (Claim 23). However, the aforementioned limitations would have been obvious to one of ordinary skill in the art in view of Nippon for the reasons set forth above in paragraph 9 (see the discussions of Claims 4 and 23).

12. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Invie et al. (USPN 6,277,485 B1) in view of either the applicant's admitted prior art (AAPA) or Nippon (JP 2002-187740 A), in further view of Birch (US 2004/0043142 A1), and in further view of Patrick et al. (USPN 5,474,648).
13. The combination of Invie et al., either the AAPA or Nippon, and Birch teaches all the limitations of **Claim 3** as set forth above in paragraph 8, except for a method wherein the plasma during the treating has an RF power less than about 30 W. Specifically, Birch teaches using an RF plasma for the vacuum plasma removal of the coating (paragraph [0054]) but is silent regarding the RF power utilized. Patrick et al. teaches that, in the art of RF plasma etching or removing of material, the amount of power in the plasma chamber greatly affects process conditions such as etching rate and other process variable parameters and therefore should be controlled to improve etch rate uniformity and consistency (abstract, Col.2, lines 13 – 45, Col.5, lines 9 – 25). In other words, Patrick teaches that RF power in a plasma process is a controllable result / effective variable that greatly affects the overall

process (i.e., other process conditions, etching rate, etc.). Therefore, it would have been obvious to one of ordinary skill in the art to optimize and control the RF power in the plasma film removal process of the combination of Invie et al., either the AAPA or Nippon, and Birch as a result / effective variable through routine experimentation. The exact RF power utilized would, of course, depend on the desired film removal rate, the thickness of the film, etc.

14. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Invie et al. (USPN 6,277,485 B1) in view of either the applicant's admitted prior art (AAPA) or Nippon (JP 2002-187740 A), in further view of Birch (US 2004/0043142 A1), and in further view of Matsuo et al. (USPN 4,687,707).
15. The combination of Invie et al., either the AAPA or Nippon, and Birch teaches all the limitations of **Claims 8 and 9** as set forth above in paragraph 8, except for a method wherein the article is an optical / ophthalmic lens. However, it is clear from Invie et al. that the optical article comprising the ARC coating and the antisoiling coating can be a lens in general (Col.1, line 7). Matsuo et al. teaches that ARCs and antisoiling coatings are typically deposited on optical lenses such as eyeglass lenses (i.e., ophthalmic lenses) so that such lenses exhibit desirable antireflective and antisoiling properties (abstract, Col.1, lines 5 – 26, and Col.8, lines 8 – 14). Therefore, it would have been obvious to one of ordinary skill in the art to perform the process of the combination of Invie et al., either the AAPA or Nippon, and Birch on eyeglass lenses (i.e., ophthalmic lenses) with the reasonable expectation of successfully obtaining

the benefits of performing the process (i.e., renewing the antisoiling coating on a lens) on a well-known species of lens (i.e., an eyeglass lens) out of the broader genus of lenses generally taught by Invie et al.

16. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Invie et al. (USPN 6,277,485 B1) in view of either the applicant's admitted prior art (AAPA) or Nippon (JP 2002-187740 A), in further view of Birch (US 2004/0043142 A1), and in further view of Goodwin (USPN 5,707,740).

17. The combination of Invie et al., either the AAPA or Nippon, and Birch teaches all the limitations of **Claim 24** as set forth above in paragraph 8, except for a method further comprising acid activating a surface of the plasma treated article (i.e., the article having the worn or deteriorated antisoiling coating removed) prior to disposing the new antisoiling coating thereon. However, Goodwin teaches that it is desirable to acid activate a surface of a coated optical substrate prior to depositing a water repellent silane or siloxane coating thereon in order to improve the durability of the subsequently deposited water repellent coating (abstract, Col.1, lines 20 – 24 and 53 – 67, Col.2, lines 30 – 45, Col.3, lines 47 – 67, Col.4, lines 63 – 67, and Col.5, lines 26 – 35 and 59 – 64). Therefore, it would have been obvious to one of ordinary skill in the art to acid activate the surface of the plasma treated article (i.e., the article having the worn or deteriorated antisoiling coating removed) of the combination of Invie et al., either the AAPA or Nippon, and Birch prior to disposing the new antisoiling coating thereon with the reasonable expectation of successfully and

advantageously improving the durability of the coating, thereby increasing the amount of time before the antisoiling coating is deteriorated and needs to be removed and replaced.

Response to Arguments / Declaration under 1.132

18. Applicant's arguments filed on 2/23/2005 have been fully considered but they are not persuasive.

19. Regarding the 35 U.S.C. 103 rejections, the applicant notes that the pending claims recite that a plasma under vacuum conditions is used to remove the previously deposited antisoiling coating from the antireflective coating (on a polymeric optical substrate). The applicant states that the surface treated by Birch et al. is a glass substrate, and the nature of a glass substrate surface is different than the nature of the antireflective coatings treated in the present application. More specifically, the antireflective coatings are more porous and are more susceptible to damage than the surface of a glass substrate. A small removal of material from the outer surface of the antireflective coating can change the optical properties of an article having such a coating. Therefore, the applicant then argues, it is not obvious that a treatment that is suitable for a robust surface (e.g., glass) would be suitable for porous antireflective coatings. In other words, the applicant argues that a disclosure that plasma cleaning can be used on a glass substrate provides no teaching or suggestion that it would be suitable for removing a previously applied anti-soiling coating from an ARC-coated article, as claimed by the applicant. To support this

position, the applicant submitted a declaration under 37 CFR 1.132 by Dr. Mark Pellerite, one of the joint inventors of the instant application. The examiner acknowledges the applicant's statement that a declaration was also submitted by Dr. Steven Martin, the other joint inventor of the instant application (see page 9 of the 2/23/2005 response). However, the Office has only received the declaration of Dr. Pellerite.

20. In response, the arguments set forth by the applicant are not convincing, and the declaration under 37 CFR 1.132 filed on 2/23/2005 is insufficient to overcome the 103 rejections of Claims 1 – 26 set forth above for the following reasons.

21. To begin, the examiner notes that the test of obviousness is not an express suggestion of the claimed invention in any or all references, but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them (*In re Rosselet*, 146 USPQ 183). In this case, the examiner agrees that Birch does not explicitly teach using the vacuum plasma cleaning treatment on an ARC-coated substrate. However, the AAPA teaches that, in the art of antisoiling coatings deposited on ARC-coated optical substrates, the antisoiling coatings may need to be <u>removed and replaced</u> at times, such as when a previously applied antisoiling coating becomes defective or partially removed during the use of the article ("Background" section of the applicant's specification, page 2, lines 11 – 15), and Nippon teaches that, in the art of water-repellent fluorosilane coatings (i.e., antisoiling coatings) on optical substrates (e.g., glass or silica-coated glass), the aforementioned coatings deteriorate over time and must be removed (i.e.,

to provide a clean surface) and replaced (paragraphs [0010], [0020], [0021], [0027], [0057], and [0070] of the translation). These teachings of the AAPA and Nippon would have clearly motivated one of ordinary skill in the art to seek-out and utilize a cleaning process that is known in the art to remove a coating from an optical substrate – Birch teaches such a cleaning process. The fact that Birch et al. also teaches that a vacuum plasma cleaning process has numerous advantages, such as: (1) effective removal of a wide variety of coatings (paragraphs [0012], [0037], and [0040]), (2) no generation of liquid waste (paragraph [0012]), (3) the ability to remove thicker coatings while leaving behind virtually no visible residue (paragraph [0014]), (4) inexpensive operation, generates no regulated waste streams, and produces clean surfaces in very short time periods (paragraph [0054]), and (5) the vacuum used in the plasma cleaning facilitates uniformity through dispersion of the plasma and therefore quickly and effectively cleans the entire surface of the material simultaneously and evenly (paragraph [0056]), would serve to further motivate one of ordinary skill in the art to utilize such a vacuum plasma cleaning process as a method of removing the antisoiling coating of Invie et al. The applicant argues that one of ordinary skill in the art would not have expected the vacuum plasma cleaning process taught by Birch to be successful if used to remove a coating from an ARC-coated (polymeric) substrate instead of a glass substrate because one would have expected such a plasma cleaning process to damage the porous, underlying ARC. This argument is not supported by the evidence of record. First, Invie et al. explicitly teaches that the metal oxide ARC deposited on the substrate is durable and hard

(Col.1, lines 41 – 42, Col.4, lines 23 – 26). This at least suggests to one of ordinary skill in the art that such an ARC would be able to be plasma cleaned without any significant damage. Also, Nippon explicitly teaches that a substrate, including a polymeric substrate (see paragraph [0042]) and a substrate that has been coated with a silica layer (see paragraphs [0055] – [0062]), silica being one of the ARC metal oxide layers taught by Invie et al. (Col.4, lines 8 – 32), can be successfully treated with a plasma to remove an overlying antisoiling layer from the surface of the substrate without damaging the underlying layer (i.e., leaving the underlying layer intact) (paragraphs [0010], [0020], [0021], [0027], [0057], and [0070] of the translation). Additionally, Invie et al. explicitly teaches plasma cleaning the surface of a porous ARC-coated substrate without any apparent damage to the coating or associated degradation of its optical properties (see paragraph 8 above for details). These teachings would lead one of ordinary skill in the art to conclude that a plasma cleaning process in general, including a vacuum plasma cleaning process (as taught by Birch et al.), would be suitable for removing a coating from a porous ARC-coated (polymeric) substrate, as desired by the combination of Invie et al. and either the AAPA or Nippon.

22. Turning to the declaration by Dr. Pellerite, the facts set forth in the declaration are as follows: (1) Based on AFM images, the surface of a glass substrate is smooth and featureless, and the surface of an ARC-coated lens is rough, porous, and particulate (i.e., the surfaces are different); and (2) the glass substrate and the ARC-coated lens responded differently to dilute HF solutions (e.g., the optical properties of the ARC-

coated lens changed, while the optical properties of the glass substrate were not altered). Based on these facts, Dr. Pellerite concludes that, without experimentation, one of skill in the art would not have known whether a plasma treatment method known to be suitable for a glass substrate would be suitable for an ARC coating on an optical article.

23. In response, Dr. Pellerite's conclusion is not supported by the art or evidence of record. To begin, the logical conclusion that one in the art would draw from the facts presented in the Pellerite declaration is that porous ARC coated substrates are more susceptible to attack by acid (e.g., HF) than uncoated glass is. The data shown in the Pellerite declaration simply does not support the conclusion presented by Dr. Pellerite (i.e., that one of skill in the art would not have known whether a plasma treatment method known to be suitable for a glass substrate would be suitable for an ARC coating on an optical article) because the only data presented was drawn to acid resistance, not resistance to plasma treatment. Importantly, the conclusion drawn by the Pellerite declaration is contradicted by the teachings of Invie et al. (note: Dr. Pellerite is a co-inventor of the Invie et al. patent), specifically that <u>sputter coated (i.e., porous) antireflective film-coated optical substrates can successfully be exposed to plasma cleaning</u> (Col.19, lines 59 – 67, Col.20, lines 1 – 37; see also Woodruff et al. (USPN 6,469,685) (Col.5, lines 18 – 23) and Dickey et al. (USPN 5,372,874), which are simply cited to show that the "CDAR" antireflective coated glass that is successfully plasma cleaned by Invie et al. comprises sputter-coated (and therefore, porous) metal oxide layers). In view of the preceding discussion,

when all of the evidence is considered, the totality of the rebuttal evidence of non-obviousness fails to outweigh the evidence of obviousness.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jallouli et al. (US 2004/0253369 A1) (effective filing date of 6/13/2003) teaches a method of removing and replacing an antisoiling coating on an ARC-coated lens wherein the removal step is performed with an activated chemical species (e.g., an oxygen plasma) at about atmospheric pressure. If applicant is unable to antedate this reference, it appears that a 102 and/or 103 rejection based on this reference may be proper.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

TIMOTHY MEEKS
PRIMARY EXAMINER

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wesley D Markham
Examiner
Art Unit 1762

WDM

WDM